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Theater Missile Defense: Issues for the 103rd Congress

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Theater Missile Defense: Issues for the 103rd Congress

SUMMARY

Theater missile defense (TMD) is increasingly an important national defense priority. Concerns over the global spread of ballistic missiles and the war against Iraq focused attention on the need for effective TMD systems in the near-term.

Since the early 1980s, Congress has urged the executive branch to develop effective TMD systems. Only after Desert Storm, however, did the military services and the Strategic Defense Initiative Organization (SDIO), now called the Ballistic Missile Defense Organization (BMDO), begin to give TMD development the funding and programmatic attention felt necessary by Congress. Now, the Defense Department appears to be committed to TMD in its defense planning.

Nonetheless, some TMD research and development programs may be redundant. There are many individual service plans to develop and deploy separate missile interceptor systems. Some TMD programs, such as those to develop effective counterforce operations against enemy theater missile systems in wartime, or passive defenses, may be receiving inadequate attention or development given their stated importance.

During the 103rd session of Congress, several key budget and policy issues are likely to be raised. How much importance should be placed on the development and deployment of TMD systems as one element of the Nation's efforts to deal with proliferation? Should TMD systems continue to be part of an overall global missile defense system? Are the Pentagon-proposed plans for the 1990s affordable? Are there areas in which significant budgetary savings are possible? As advanced TMD development proceeds, questions regarding the salience of the ABM Treaty are likely to become an important part of the debate as well.

An important question considered by the last Congress was whether TMD programs should be stripped from SDIO (now BMDO), partly in response to frustration over what Congress believes was Pentagon unresponsiveness to a clear congressional mandate for TMD initiatives. Depending on Clinton Administration plans, Congress may pursue this further.

Finally, a sensitive foreign policy issue concerns future U.S. support for the Israeli Arrow program. Questions about Arrow's utility and affordability are being raised against a backdrop of concerns over Israeli technology transfers to other countries.

MOST RECENT DEVELOPMENTS

In January 1993, outgoing SDI Director Henry Cooper detailed the Pentagon's plans for theater missile defense (TMD) spending. From FY1994 through FY1999, the TMD budget was planned at slightly more than $20 billion, or about 40% of the entire strategic defense initiative (SDI) cost for that period. In February, Defense Secretary Les Aspin ordered a revised, scaled-back SDI budget plan in which TMD programs have top priority. Based on this guidance, the Strategic Defense Initiative Organization (SDIO) plans to spend about $17 billion on TMD from FY1994 through FY1999. In May 1993, Defense Secretary Aspin renamed SDIO the Ballistic Missile Defense Organization (BMDO). Also, a bottom-up review of Pentagon programs, including TMD, has been ordered; results are expected soon.

BACKGROUND AND ANALYSIS

Background

Today, theater missile defense (TMD) is increasingly an important national security priority for the Pentagon and the military services. But this has not always been the case. Before the war against Iraq in early 1991, the proliferation of ballistic missiles and weapons of mass destruction seemed to most observers a serious, yet manageable, problem. Iraq's missile attacks against Israel, Saudi Arabia, and U.S. forces in Saudi Arabia during the war proved that missile proliferation could present direct risks to U.S. forces and strategic interests. National leaders became increasingly interested in developing and deploying effective missile defenses as a key element of a broader, growing commitment to counter the spread of weapons of mass destruction and their means of delivery.

The relatively modest attention that was paid to TMD issues during the 1980s resulted primarily from congressional interest in developing defenses against potential Soviet short-range missile attacks in Europe. During this period, the public record reflects Congress's frustration with what it considered to be the unresponsiveness of the Defense Department to the tactical missile threat (see CRS Report 91-456F, *The Patriot Air Defense System and the Search for an Antitactical Ballistic Missile Defense*). Only since the war against Iraq has the Department of Defense emphasized TMD on a par to that prescribed by Congress.

The current TMD effort raises many questions for Congress to consider: Should TMD play a major role in U.S. efforts to respond to global missile proliferation? Is DOD's TMD plan affordable? Does TMD threaten the 1972 Anti-Ballistic Missile (ABM) Treaty? Should the TMD effort be removed from the Ballistic Missile Defense Organization (BMDO)? Should each military service continue to develop its own TMD system? Should the United States continue to support the Israeli Arrow TMD program? Should TMD systems be sold or given to U.S. allies and friends? And, how should TMD systems be integrated with U.S. general purpose forces? Congress' decisions on these issues may have important implications for U.S. military strategy, defense funding requirements, nonproliferation efforts, and relations with its friends and allies.

What is Theater Missile Defense (TMD)?

Theater missile defenses are those defensive systems designed to attack and destroy theater missiles and systems, or mitigate the consequences of a theater missile attack. Theater missiles include ballistic missiles, cruise missiles, or air-to-surface guided missiles whose launch point and target lie within a theater (or region). The Patriot system used in the 1991 war against Iraq illustrates a basic TMD system, which is composed of missile interceptors, sensors, and command, control and communications elements. TMD does not include defenses directed against long-range missiles capable of intercontinental flight (this is sometimes called strategic ballistic missile defense). Some Third World countries acquired short-range missiles from the Soviet Union and other countries, while other Third World countries produce such missiles indigenously or have programs underway to develop them.

Despite the current consensus that missile proliferation threatens U.S. national security interests and challenges defense planning, there remain competing perspectives on how best to pursue the TMD effort. One approach views TMD as part of a broader, global missile defense designed to defend allies and friends alike at a moment's notice from missile attacks arising from any place around the world. This was the Bush Administration's approach and is generally preferred by the strongest advocates of ballistic missile defenses. The other approach emphasizes stand-alone TMD systems that the military services can readily deploy in a crisis and from which allies and friends might also benefit, or even purchase or acquire themselves. Many in Congress and the Clinton Administration appear to favor this approach. Despite their differences, both approaches support additional arms and technology controls to prevent or slow the global spread of missiles and weapons of mass destruction.

Congressional Interest in TMD

Since the early 1980s, Congress has expressed strong support for the fielding of effective TMD systems to defend U.S. and allied military forces against tactical cruise and ballistic missiles. Congress has pursued this agenda in three ways: first, it has actively spurred the Defense Department toward deploying a near-term TMD system, primarily pushing for development, and later deployment, of the Patriot antitactical missile defense, or PAC-2 system; second, it has pushed the Defense Department toward developing longer-term and more effective TMD technologies; and third, it earmarked TMD budgets to ensure their full funding and support, even while constraining overall budgets for BMD.

The Desert Storm experience reinforced and focused Congress' commitment to TMD. As a result, Congress passed the 1991 Missile Defense Act (P.L. 102-190), which, among other things, called for a national commitment to develop and deploy effective TMD systems at the earliest practicable date. Also, partly because of perceived mishandling of the TMD mandate then by the Pentagon and SDIO, Congress, in the FY1993 Defense Authorization Act (P.L. 102-484), approved the creation of a new TMD Initiative (TMDI) office. At the discretion of Defense Secretary Cheney, this office became part of the SDIO.

Development of TMD Policy. Partly in response to congressional directives in the early 1980s, the Army at the time identified military requirements for a theater missile defense and expanded the capability of the Patriot air-defense system to include

self-defense against Soviet tactical ballistic missiles. The SDIO was formed in 1984 to address "the threat posed by strategic missiles" to the United States and U.S. friends and allies overseas. In 1985, President Reagan directed SDIO to "develop cost-effective approaches for defending the United States and our allies against nuclear and conventionally armed ballistic missiles of all ranges." Further DOD guidance then focused the SDI TMD effort toward assisting the NATO air defense effort against the possibility of a Soviet missile attack against NATO forces in Europe. The Pentagon gave little attention to dealing with potential Third World missile proliferation.

The demise of the Soviet Union, the end of the Cold War, and the war against Iraq brought a new focus to the SDI and TMD programs. In January 1991, President Bush announced that the SDI program would be refocused to provide a missile defense of the United States, to U.S. forces deployed abroad, and to U.S. friends and allies against limited ballistic missile attacks, whatever their source. This new focus is called GPALS (Global Protection Against Limited Strikes), in which TMD plays an integral role.

Since 1991, the TMD program has been expanded to emphasize the transition from research and development to acquisition of TMD systems. TMD budgets have increased significantly over the past two years. If accepted, BMDO's near-term (1993-1998) TMD architecture (or system concept) would consist largely of upgraded, existing land-based air-defense interceptors, and land- and sea-based radars, sensors, and communications systems whose purpose would be to extend the military's current capabilities to include limited defenses against theater missile attacks. BMDO's planned long-term (post-1998) architecture entails an additional sea-based TMD system, and new ground-based interceptors and radars. All these plans are currently under Pentagon review, however.

TMD Mission Areas. As part of the Defense Department's normal acquisition process, every major weapon system must be justified by a Mission Needs Statement (MNS) approved by the Joint Chiefs of Staff (JCS). Such a statement was approved in early 1992 to guide the services' TMD efforts. It states that TMD is needed to 1) prevent the launch of theater missiles against U.S. forces, allies, and areas of interest; 2) protect U.S. forces, allies, and areas of interest against theater missile attacks; 3) reduce the probability of, and minimize the effects of, damage caused by a theater missile attack; and 4) detect and target theater missile platforms, to detect, warn of, and report theater missile launches, and coordinate a multifaceted response to a theater missile attack and integrate it with other military combat operations.

According to the JCS, these objectives require certain capabilities, which they group into four mission areas. These four areas serve to guide the service's development of TMD programs. The first is called *counterforce or attack operations*. Here the stated objective is to prevent theater missiles from launching in the first place by using the full range of military offensive capabilities. The second, called *active defense*, is what is generally understood when discussing TMD. This objective requires the ability to protect against missile attacks by seeking to destroy attacking missiles at every point of their flight trajectory. The third mission area is referred to as *passive defense*, or the ability to reduce the possibility of the potential effects of a missile attack. Finally, the TMD system requires an overall ability to coordinate attack operations, active defenses, and passive defenses and integrate the TMD system into the overall combat operation. This is called C^3I (command, control, communications, and intelligence).

Relationship to GPALS. There is no specific Mission Needs Statement for the Bush Administration's GPALS concept. Nonetheless, on paper TMD systems technically are still planned for concurrent deployment with a National Missile Defense (NMD) of the United States and preliminary to deployment of a Global Protection System (GPS). (These three elements -- TMD, NMD, and GPS -- comprise the GPALS system.) These plans are currently being reviewed. Most observers do not believe that the GPALS concept will survive.

In addition to the technical and systems relationships of TMD and GPALS, there is a strong political relationship. The Bush Administration believed that support for GPALS rested on the more popular support for TMD and a National Missile Defense of the United States. In contrast, Congress supports TMD development as a distinct program not required to be integrated with other missile defense systems, particularly space-based interceptors.

TMD Organization

This section provides basic information on how the Pentagon is now organized to develop, deploy, and utilize theater missile defenses.

BMDO Role. The BMD Organization has three TMD roles. First, BMDO has central responsibility to develop advanced TMD systems. Second, in coordination with all of the military service and acquisition heads, BMDO is responsible for identifying the funding required for developing those TMD systems. Finally, BMDO is given the day-to-day responsibility for administering and managing all TMD programs. When Congress directed the Defense Department to create a new TMDI office, it gave the Secretary of Defense discretionary authority over how it should be done. In December 1992, Secretary Cheney decided to place the new TMDI Office within SDIO, thus leaving its TMD role apparently unchanged for now.

Service Roles. The military service roles and missions are broadly outlined in the SDIO *Theater Missile Defense Report to Congress* of March 1991. The services are to 1) help establish operational requirements for TMD systems; 2) manage TMD programs under BMDO's direction; 3) support plans for testing and evaluating TMD programs, as well as producing, deploying, and operating proposed TMD systems; and 4) plan for and fund TMD systems after their transfer from BMDO to the military service, including costs for TMD operations, support, and force structure. All the services have formally agreed to these roles and missions.

In addition, each service has agreed to undertake more specific responsibilities. The Army is designated to be the combat and material developer for all ground-based and any Army space-based and airborne TMD systems. The Navy is designated to be the combat and material developer for any sea-based TMD components. The Marine Corps is tasked to identify and define requirements for TMD self-defense for forward deployed and expeditionary military forces. The Air Force is designated to be the combat and material developer for all space-based, airborne, and some ground-based TMD system support components. Each service is required to coordinate its efforts with the other services.

The Roles of Other Organizations. Several other defense organizations are also given TMD-related responsibilities. These include the Defense Intelligence Agency,

which identifies specific threats that U.S. TMD systems would be required to face in future scenarios; the Defense Communications Agency, which develops TMD telecommunications requirements; the Theater/Specified Commanders-in-Chief (CINCs), who identify TMD requirements for their regions of responsibility; and the Chairman of the JCS, who, in conjunction with the CINCs, will coordinate and validate TMD mission needs and operational requirements, and establish command and operational control doctrines, command relationships, force structures, and rules of engagement for wartime use of TMD systems.

Status of TMD Programs

This section briefly reviews the current status of selected TMD programs. (For a more detailed review, see CRS Report 93-585 F, *Theater Missile Defense Policy, Missions, and Programs: Current Status*, June 11, 1993.) These programs are described below in the context of the four TMD mission areas identified by the JCS Mission Needs Statement outlined earlier.

Counterforce Operations. This mission area consists of efforts to use existing conventional military systems and operations to prevent missiles from being launched. Actions such as destroying missile launch platforms, support areas, and missile storage facilities, can in theory be performed by all U.S. offensive forces, including air, ground, maritime, and special operations forces. For example, naval cruise missiles or Army tactical missiles could be targeted against enemy theater missile components and storage depots. Special operations forces could be used for gathering intelligence, spotting enemy missiles for regular ground and air operations forces, or destroying key enemy missile facilities themselves. Reconnaissance satellites can help identify targets. Few special new initiatives or programs, however, have been identified for this mission.

Reportedly, defense planners have studied operations in Desert Storm to assess the potential for counterforce operations in future TMD scenarios. A key question is whether the diverse service efforts could be more effective if they were pursued in a more coordinated manner. It is uncertain whether TMD counterforce operations will receive top priority in any future conflict where the threat of missile attacks is great. Finally, it is unclear how successful such operations will be in wartime. The Desert Storm experience was considered disappointing because allied forces were simply unable to destroy Iraqi mobile missile launchers and other facilities.

Active Defenses. TMD interceptor programs are designed to provide effective defenses against a theater missile once it has been launched. This includes the requirement for capabilities to destroy missiles at every point along their flight trajectory, from immediately after launch to shortly before impact. Active defenses could consist of ground-, air-, sea-, and space-based TMD interceptors. Each of the four military services is developing comparable near- and long-term TMD interceptor systems.

The services are pursuing several near-term programs to give them some TMD capability in case it is needed in the next few years. The Army is upgrading the current version of the Patriot missile system (built by Raytheon in Massachusetts and Florida), called the PAC-3 (the PAC-2 version was used in Desert Storm), to include an improved warhead. The Army is also developing a new interceptor, THAAD, for possible prototype deployment in the mid-1990s (described below). The Navy is upgrading its

Aegis destroyer SM-2 Block IV A air-defense missile (and associated sensors and computers) to give it a limited defensive capability comparable to the Patriot PAC-2 system. The Army is upgrading the Marine Corps Hawk air-defense system to provide a limited, mobile TMD capability.

Most TMD budget support, however, is given to developing long-term interceptor technologies that would seek to provide increased effectiveness and a greater area of coverage. These defenses might extend from a few dozen to perhaps hundreds of miles. In contrast, the defensive range of the Patriot used in Desert Storm was about a dozen miles or less.

Three major TMD programs are being pursued to develop a wide-area defense against theater missile attacks. The first is the space-based Brilliant Pebbles interceptor program, which, according to BMDO, would be capable of destroying attacking missiles (by direct interception) during the relatively short time they travel through space. According to BMDO, Brilliant Pebbles interceptors could destroy short-range missiles with ranges greater than 300 kilometers. This program has recently been deemphasized.

The Army's THAAD (Theater High Altitude Area Defense) is the second major (and perhaps most well known) active wide-area defense program under development. THAAD interceptors would seek to destroy incoming missiles as soon as they reenter the earth's atmosphere and, if necessary, later again in the attacking missile's flight trajectory. This system would be transportable (i.e., it would be carried on large cargo planes to its deployment site and would be mobile within the theater). THAAD might permit destruction of the missile at long-range and high altitude. In response to the TMD mandate in the Missile Defense Act, a prototype THAAD battery (called a User Operational Evaluation System, UOES) is planned to be available at the end of THAAD's normal demonstration and validation phase (1996). The THAAD development contractor (Lockheed, in California) was chosen in late 1992. The THAAD UOES program may allow for early operational assessments to be made and could be deployed during a crisis for use by the U.S. military. The decision to produce the UOES missiles is planned for FY1995 by the Pentagon. Fully operational batteries would be available by 2002; the total program cost, including the TMD radar, is estimated at $7.5 billion.

The Navy is pursuing the third major active wide-area defense program, with two options. First, the Navy and Army determined that the THAAD interceptor could be used on Aegis ships (where naval air-defense missiles are now deployed). A Navy decision to proceed is planned for 1994. A second, more ambitious system might integrate LEAP (a lightweight space interceptor) into the Navy's air-defense Standard Missile (SM-2). The Navy hopes this might give the SM-2 a capability to intercept attacking missiles in space. A Navy SM-2/Leap UOES might be available in 1997, with fully operational capabilities by the turn of the century.

There are also a few programs under consideration to examine the possibility of destroying attacking missiles shortly after they are launched. The Air Force has been looking at a near-term concept to modify existing air-to-air missiles on fighter planes to attack theater missiles before they leave the atmosphere, preferably over enemy territory. Air Force officials are not optimistic that these plans will be successful. A longer term Air Force airborne laser concept under consideration, however, might prove

more feasible. The United States is now negotiating with the Israelis over a long-term concept to develop unmanned aerial vehicles that would fly over enemy missile launch areas and then intercept missiles during the first phase of their flight. None of these programs, however, is scheduled for demonstration and validation studies.

Finally, several active defense programs are under development that would provide for a smaller area of defended coverage. There are two candidates for the Patriot PAC-3 missile; the Multimode Missile and the ERINT (Extended Range Interceptor). A decision is planned for mid-FY1994. The total Patriot PAC-3 upgrade program will cost about $2.7 billion. The Army is developing a TMD system, called CORPS SAM, for possible Marine Corps use. CORPS SAM is designed to be a mobile point-defense system for expeditionary forces. The Pentagon is reviewing this program for the demonstration and validation phase of its development. Many observers believe that CORPS SAM development will be put on indefinite hold. The Marine Corps currently wants to being fielding CORPS SAM in about 2005.

Passive Defenses. Passive defenses, identified as another key element of the U.S. TMD program, might include deception, camouflage, concealment, hardening, mobility, dispersal of key assets, and electronic warfare. Many of these activities are already being pursued in the services to reduce vulnerability to attack by conventional weapons. Such efforts can make it difficult or impossible for an enemy to target important military assets, including TMD systems themselves. For example, the Patriot Remote Launch program will permit Patriot antitactical missile launchers to be deployed at a distance from the system's radar. This is intended to increase the survivability of the Patriot system. The Patriot Remote Launch program is being pursued in three deployment phases, each with increasing capability, through the remainder of this decade. Other passive defense programs are harder to identify. In 1992, passive defense spending declined to about $1 million from $1.6 million in 1991. No funding is planned for FY1994.

As with counterforce operations, it is unclear how future BMD funding, explicit interservice cooperation, coordination, and sharing of technological gains in passive defense development programs will affect wartime operations against theater missile attacks. It is also unclear whether there may be unnecessary duplication of effort within the services.

C^3I (Command, Control, Communications, and Intelligence). The principal budget support for TMD C^3I now goes for upgrading existing sensors and developing a new radar. In the near-term, the Navy is modifying the SPY-1 air-defense radar and various battle management and control capabilities aboard Aegis ships to permit a near-term TMD capability using an upgraded Aegis air-defense missile (SM-2 Block IV A). Additional upgrades to the SPY-1 radar are planned for use with the Navy's eventual long-term interceptor choice. The Marines are upgrading their TPS-59 radar in conjunction with a modified Hawk missile to give them a limited, near-term TMD capability. The Air Force is reportedly improving some of its satellite reconnaissance assets to assist in a range of TMD operations.

The U.S. Army is developing a much more capable mobile radar system called the TMD-GBR (Ground-Based Radar). It is scheduled for production after the year 2000 and will be the mainstay for ground-based TMD systems. If deployed, the TMD-GBR system would provide the necessary fire control for the planned THAAD system and kill

assessment and target cuing to Patriot PAC-3. Two deployable radars are scheduled to be available for operational assessments about 1995, during the normal demonstration and validation phase of development. Again, the degree to which there is interservice coordination or an overall strategy for developing more capable and integrated C^3I assets for TMD is unclear.

Israeli Arrow Program (ACES). The ACES (Arrow Continuation Evaluation Study) is an ongoing, joint U.S. (BMDO)-Israeli program to develop and deploy an area-wide TMD system for use by Israel in the late 1990s. The interceptor range of the Arrow is considered comparable to the U.S. Army THAAD system. The Arrow, however, would use an explosive warhead, in contrast to THAAD's hit-to-kill design (i.e., a direct interception at high speed). The United States will pay for 78% of the program's development cost, while Israel will pay for the balance of the estimated $350 million, 4-year effort. The final cost of the Israeli TMD system, consisting of perhaps hundreds or thousands of Arrow interceptors and many radars, other sensors, and fire control systems is unknown. Some experts here and abroad, however, predict the system may cost $2 billion to $10 billion. The United States has not committed to support this program beyond some stage in the research and development cycle. Israel has not yet made a public commitment to produce and deploy Arrow.

In March 1993, the first successful launch and demonstration of Arrow's interception accuracy was reported. The first test of an actual ACES intercept is scheduled later this year. Although the United States does not plan to acquire the Arrow for its own use, the BMD Organization continues to cite several technical benefits from this collaboration, including better understanding of explosive warhead concepts for TMD purposes.

ACES is a follow-on to the original 3-year Arrow program (1988-1991), which many considered disappointing; one of the planned primary objectives, an actual missile interception, never occurred due to serious technical problems with the missile's design and construction. These problems were apparently fixed after extensive U.S. technical assistance; an Arrow test launch occurred in late 1992. Concerns over system affordability and technology security are now being raised by some in Congress and elsewhere.

Analysis

What Role Should TMD Play?

Missile Proliferation and U.S. Foreign Policy. There is broad political support in this country for TMD. In fact, there is virtually no opposition to the need to develop and deploy effective TMD in a world where nations are acquiring missiles and weapons of mass destruction. Such widespread support largely occurs because most policymakers believe the United States will and must continue to play an activist role in the post-Cold War world. There are many potential regional conflicts and scenarios in which the United States might become engaged and in which regional missile proliferation is of grave concern. The reasoning goes that if U.S. involvement means putting U.S. interests or military at risk of missile attack, then defense planners must have military (i.e., TMD) options to deal with such risks.

What is not well understood, however, are the foreign policy and defense planning implications of a region marked by proliferation (i.e., missiles and weapons of mass destruction), instability (i.e., security, political, economic, ethnic, religious), and widespread deployments of theater missile defenses. Therefore, some would argue that while there may appear to be compelling reasons to support the deployment of TMD systems as a response to proliferation, policymakers and analysts may want to probe more deeply into the potential consequences of such decisions.

Arms Control and TMD. In current discussions over the role of TMD, questions are raised over the appropriate emphasis and focus for arms control as part of an integrated U.S. policy to counter global proliferation. Strong support for TMD reflects to some extent a pessimistic (some would say realistic) view of U.S. and global abilities to prevent proliferation.

Most observers believe that the variety of arms control measures available are complementary to U.S. TMD efforts. These measures include strengthening existing national and international technology and export-control regimes; supporting and promoting regional confidence-building measures; encouraging international commitments to existing arms control regimes; and advocating new measures. The expectation is that through national and international commitments to nonproliferation, the proliferation of missiles and weapons of mass destruction will at a minimum be slowed and in some cases actually reversed. Other observers are doubtful that arms control can prevent further proliferation of missiles and weapons of mass destruction. They are thus convinced that effective TMD efforts are critical to U.S. national security objectives.

GPALS and TMD. Which TMD approach should be taken regarding the relationship of TMD to GPALS? This question remains a part of the debate. The Bush Administration argued that in most crises, there would be insufficient time and preparation to put TMD systems in place overseas. The inability to deploy TMD systems quickly would therefore require the capability to destroy theater missiles arising from any point on the earth against any target with prepositioned weapons. Hence, President Bush and others believed space-based interceptors and sensors were necessary to ensure an effective theater missile defense (i.e., GPALS). Congress, and possibly the Clinton Administration, argue that the adverse political costs and arms control implications of deploying space-based weapons cannot now be justified. Instead, TMD systems should be capable of rapid deployment (and rapid operation once deployed) in times of crisis and should be sufficiently diverse to cover a range of plausible scenarios. Most observers would agree that it is not likely that the Bush view will prevail in the 103rd Congress. But it is worth noting that while funding for research and development of Brilliant Pebbles was reduced through the end of this decade by the Clinton Administration, it was not eliminated altogether.

Is TMD Affordable?

TMD Development Costs and Redundancy. TMD budget plans have experienced dramatic projected increases and changes over the past two years. In January 1993, the Bush Administration projected TMD spending for FY1994 - FY1999 at slightly more than $20 billion. Under guidance from the new Defense Secretary to reduce overall BMD budget plans and give TMD top priority, BMDO recently revised this figure to about $17 billion. The FY1994 TMD budget is expected to double the

FY1993 TMD budget. The Pentagon expects TMD budgets to continue to increase through this decade as research and development programs proceed toward procurement and eventual deployment.

The dramatic increases in TMD spending are due largely to widespread bipartisan political support for TMD, as well as new military service interest in carving out TMD roles and missions in the post-Cold War era. The Navy especially will account for a large increase in TMD budgets. The Navy has come to believe that it may be the first, if not only, U.S. military force on the scene in many future conflicts. Many observers agree with this assessment. Therefore, developing effective Navy TMD capabilities would appear to enjoy strong support.

However, the prospect of spending $2 billion to $3 billion per year on TMD alone through this decade will likely receive close congressional attention in 1993. Congress is likely to examine issues such as program concurrency and BMDO decisions to pursue parallel demonstration and validation programs for comparable TMD concepts and missions. For example, while the different service rationales for possessing independent wide-area TMD capabilities (e.g., the Army's THAAD, the Navy's marinized THAAD or SM-2 Block IV/LEAP, and the Israeli ACES) may be persuasive, the budgetary implications of pursuing them all might be adverse. Similarly, some might view concurrent development of the Army's Patriot PAC-3 and ERINT, and the CORPS SAM program as unaffordably redundant. Hard choices for budget and policy planners may therefore lie ahead. The 103rd Congress may choose to make some of these choices itself, especially if results of the Pentagon's bottom-up review arrive too late in the congressional defense authorization and appropriation cycle.

TMD Deployment Costs. When included in the GPALS architecture, TMD acquisition costs were estimated at about $14 billion. About $1 to $2 billion of the estimated $17 billion projected for TMD spending through this decade is planned for production of some TMD components. Because the Bush Administration did not consider TMD systems separate from an overall GPALS, the true costs of deploying stand-alone TMD systems through this decade and beyond are not yet known. Congress may therefore take considerable interest in exploring the Clinton Administration's approach to TMD in the FY1994 defense budget cycle. Congress may also wish to examine at an early date the force structure requirements and implications of TMD systems on the services as part of its effort to understand better the total costs of deploying TMD systems and determining their affordability.

Does TMD Threaten the ABM Treaty?

TMD Capabilities and ABM Treaty Definitions. The 1972 ABM Treaty (and its 1974 Protocol) does not restrict TMD. Instead, the Treaty restricts testing and deployment of missile defenses designed to attack strategic ballistic missiles. The Treaty permits up to 100 ground-based interceptor missiles and associated ground radars at one site for strategic BMD purposes. The United States specified its permitted site near Grand Forks, North Dakota, and briefly deployed a defense system there from 1974-1975. The Treaty bans all testing and deployment of mobile ground, air, sea, and space-based missile defenses against strategic ballistic missiles.

Nonetheless, there are significant treaty concerns over the prospect of advanced TMD testing and deployment, partly because the ABM Treaty does not define a

"strategic ballistic missile." Generally, a strategic missile is presumed to possess a range capability greater than 5,500 kilometers, or intercontinental range. Nonetheless, many ABM Treaty proponents argue that some theater-range missiles in some advanced TMD tests (including interceptors and sensors) duplicate some of the speed and trajectory characteristics of older so-called "strategic" missiles with ranges considerably less than 5,500 kilometers. For this reason, some arms control advocates urge caution because such tests could damage the ABM Treaty by inadvertently contributing to its erosion in so-called gray areas, where treaty ambiguity ensures some level of uncertainty.

Two solutions are offered by those who take this position. One is not to proceed with testing and deployment of TMD systems capable of intercepting medium-range missiles (with ranges greater than about 1,500 kilometers). The other is to seek treaty clarifications through either formal amendment or understandings to permit advanced TMD testing. Although the debate over TMD and the ABM Treaty has not been very public to date, as more advanced TMD testing is planned, this debate will almost certainly expand. On this issue, Congress will probably be an important factor, given its long-standing interest in arms control issues, especially support of the ABM Treaty.

GPALS and TMD. There is no disagreement that GPALS, because of its complement of space-based interceptors and sensors and its large number of ground-based strategic ballistic missile interceptors, would violate the ABM Treaty. Space-based interceptors that could intercept theater *and* strategic missiles would also violate the ABM Treaty. For GPALS testing and deployment to proceed, the ABM Treaty would have to be abrogated or supplanted with a new defense and space treaty permitting such plans. This change was proposed by the Bush Administration; it is likely to be rejected formally by the Clinton Administration sometime in 1993.

Should TMD Programs Be Removed From BMDO?

Congressional Concerns. For several years, a growing concern in the House of Representatives over SDI management of TMD programs has led to various legislative initiatives to remove the TMD function from the old SDIO. These concerns were largely based on frustration with the organization's management of the congressional mandate to develop and deploy TMD at the earliest date. The perception was that the TMD effort would remain in second-class status vis-a-vis strategic and space-based defense programs if SDIO retained final program authority.

The FY1993 Defense Authorization Act created a new TMDI office within the Pentagon with the organizational location left to the discretion of the Defense Secretary. House and Senate conferees agreed that SDIO could continue to manage TMD programs, but they sought to ensure that TMD and SDI research would be closely coordinated to avoid redundancies and to maximize the incorporation of technologies common to TMD and strategic defense.

Congress is likely to continue monitoring TMD development within the new BMDO closely. But, because the Clinton Administration position on TMD appears likely to parallel congressional interests, further legislative efforts to strip this function from BMDO may wane. Some would argue that such a separation would lead eventually to BMDO's demise.

Concerns of Strategic Missile Defense Advocates. Strategic missile defense proponents, including the Bush Administration, argued strongly against removing TMD from the SDI Organization. The BMDO remains concerned because it wants to pursue and coordinate common technological advances in TMD and strategic missile defense research and thereby keep spending down. BMDO does not believe this would be possible if TMD programs were removed entirely from its purview. Some critics have suggested another ulterior motive on the part of BMDO. They contend that the organization wants to use popular bipartisan support for TMD to shore up less stable support for a treaty-compliant ABM defense of the United States and make up for lack of support for space-based weapons research in the BMDO budget.

Should the United States Pursue Arrow?

Are There Technological Benefits for BMDO? Although the United States does not have any plans to deploy the Arrow for its own use, the Pentagon cites several technical reasons for supporting it. These technical reasons have changed over the past several years. Currently, the first reason is that Arrow research gives strategic defense planners another data point to understand the challenges of, and prospects for, TMD. Critics would charge that such benefits are marginal, given the proliferation of U.S. TMD programs. The second benefit cited is that Arrow helps the United States better understand the concept of a focused warhead designed for destroying chemical and biological warheads. Most observers agree that there are few good technical analyses as to how to render such weapons ineffective, but are unsure whether the Israeli approach will prove effective.

What Are the Potential Costs to the United States? During the current development phase, the United States will pay 72% of an estimated $350 million program over about four years. Few observers would argue that by itself this is unaffordable. By 1995, however, the United States will face a major decision whether to commit to support final development and perhaps deployment of the Arrow system for Israel. The total program costs are estimated at $2 billion to $10 billion, and some observers have begun to question whether the United States could or should subsidize this effort. Others, including some prominent Israeli military leaders, do not believe Israel could afford such a system by itself, an option it apparently could pursue absent U.S. budgetary support. This leads to an obvious question: Will the United States consider fully or partially subsidizing deployment of the Arrow, which is also likely to stand in funding competition with comparable U.S. systems?

Some observers are beginning to suggest that if the Israelis want an effective TMD they should consider acquiring the U.S.-built THAAD system when it is available. The Israelis would object to this for two reasons. First, in Israel's current view, THAAD will not be available soon enough. Israel's perception of Patriot TMD's performance in Desert Storm, coupled with the fact that Israel faces hostile neighbors now armed with missiles, argues for deployment of a more advanced TMD system as soon as possible. Second, many Israeli leaders argue it is important for Israel to build up its own defense industries with advanced technology projects, such as Arrow. Israel also views the four to one U.S. investment in Arrow a good investment in its defense industry. Because of Congress' long-standing support for Israel, these issues are likely to be considered during this session.

What Is the Relationship of TMD To General Purpose Forces? In some respects, TMD is only in its infancy. A number of questions can be raised regarding the integration of TMD forces with existing military air-defense and theater operational doctrines and capabilities. How much priority will be given to TMD missions in future regional conflicts? How will the various service TMD systems be integrated operationally? How will TMD systems be integrated with air defense systems? How will TMD systems be integrated with ground and air attack forces?

The JCS Mission Needs Statement identifies the threat to be dealt with (theater ballistic missiles, cruise missiles, and air-to-surface missiles), but there is no evidence of interservice coordination on these issues at this point. Currently, these questions remain largely unanswered by the services. In fact, control over TMD roles and missions was the subject of intense interservice rivalry in late 1992, with the Air Force seeking to claim primacy over the Army. JCS Chairman Colin Powell's triennial report on military roles sought to resolve some of these issues, but concluded that no change in the current roles, missions, and responsibilities for TMD was required.

Relevant Legislation Enacted during the 102nd Congress

P.L. 102-484, Section 231. National Defense Authorization Act for Fiscal Year 1993. Established a Theater Missile Defense Initiative office within the Department of Defense. All theater and tactical missile defense activities of the Defense Department shall be carried out under the TMDI. Authorizes up to $935 million for research, development, testing, and evaluation, and earmarks $90 million of that amount for innovative naval TMD concepts.

P.L. 102-190, Sections 231-236. National Defense Authorization Act for Fiscal Years 1992 and 1993. Established the 1991 Missile Defense Act, which, among other things: 1) states "it is a goal of the United States to . . . provide highly effective theater missiles defenses to forward-deployed and expeditionary elements of the Armed Forces of the United States and to friends and allies of the United States"; and 2) "the Secretary of Defense shall aggressively pursue the development of advanced theater missile defense systems, with the objective of downselecting and deploying such systems by the mid-1990s."